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APR 13 2007

Remarks

This amendment is submitted in response to the Office Action mailed October 5, 2006.

Review and reconsideration of this application are respectfully requested in view of this amendment.

Claims 1, 2, 8, 10 and 21-28 are pending in this application.

New claim 28 is added to further define the reinforcement materials on the hose of claim 10.

Applicant notes and appreciates the examiner's withdrawal of the 35 U.S.C. 112 rejection made of record in paragraph 6 of the Office Action mailed March 23, 2006.

**New Objections**

(1) The amendment filed September 22, 2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. The added material which, allegedly, is not supported by the original disclosure is as follows: "0.5 to" in Amdt. B and the replacement of "2" with "8" in the paragraph bridging pages 8 and 9 in Amdt. B.

(2) The amendment filed September 22, 2006 is further objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. The added material which, allegedly, is not supported by the original disclosure is as follows: a tubular structure (in regard to material added to claim 1) or hose (in regard to material added to claim 10), consisting essentially of a combination of about 30% to 75% of the matrix and 25% to 70% of the additive, is not supported.

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APR 13 2007

**Response to New Objections**

(1) With respect to the previous amendments to the specification, applicant notes that certain words were omitted from the amended first full paragraph on page 5. Accordingly, applicant has now amended the previously amended paragraph to add the missing words. Applicant apologizes for any inconvenience this may have caused the examiner.

The change in the percentage of the peroxide from "about 5%" to the range "about 0.5 to 5%" has not be changed since peroxides in an amount of about 0.5 to 5% is adequately supported by the specification as originally filed. For example, the upper limit of about 5% peroxide is shown at page 5, line 13; a range of about 0.5 to 2% peroxide is found at page 6, line 18; Example 1, A, illustrates Di(t-butylperoxy)diisopropyl benzene (peroxide) in an amount of about 3.9%; and Example 2, G-M, illustrate Dicumyl peroxide in amounts of about 3.5%, 2.7%, 1.9%, 4.2%, 4.9, 4.5%, and 4.4%, respectively. It is believed that the peroxide range of about 0.5 to 5% is fairly supported by the specification and the Examples.

With respect to the examiner's objection to the change in the range for the process aids from "0.8 to 2%" to "0.8 to 8%", applicant directs the examiner's attention to page 5, line 11 where "process aids in an amount up to about 8%" is discloses.

(2) In view of the amendment to claims 1 and 10 wherein the term "matrix" has been deleted and the fact that the specification at page 6, lines 1-3 clearly discloses "about 30 to 75% copolymer" and "about 25 to 70% additives, it is believed that this objection can be withdrawn.

**New Rejections – 35 U.S.C. 112**

(1) Claims 1, 8, 10 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain(s)

subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. A tubular structure (in regard to claim 1) or hose (in regard to claim 10) consisting essentially of a combination of about 30% to 75% of the matrix and 25% to 70% of the additive is not supported in the specification as originally filed. A tubular structure (in regard to claim 8) or hose (in regard to claim 24) consisting essentially of a combination of about 45% to 60% of the matrix and 40% to 55% of the additive is not supported in the specification as originally filed. In further regard to claim 8, the recitation "up to about 8%" (line 7) is not supported in the specification as originally filed. In further regard to claim 24, the recitation "up to about 8% (line 8) is not supported in the specification as originally filed, and the recitation "0.5 to 5%" (line 21) is not supported in the specification as originally filed.

(2) Claims 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 26 and 27 recite the limitation "said inner tubular structure: in the first line of both claims. There is insufficient antecedent basis for this limitation in the claim.

#### **Response to the Claim Rejection – 35 U.S.C 112**

(1) In view of the amendments to claims 1 and 10 wherein the term "matrix" has been canceled from both claims 1 and 10, and the fact that the specification clearly discloses at page 6, lines 1-3 that the polymeric composition includes about 30 to 75% copolymer and about 25 to 70% additives, it is believed that this rejection can now be withdrawn.

In view of the amendment to claims 8 and 24 wherein the term "matrix" has been canceled from claim 8 and 24, and the fact that the specification clearly discloses, at page 6, lines 4-6, that the ethylene-vinyl acetate copolymer comprises about 45 to 60%

ethylene-vinyl acetate copolymer and about 40 to 55% additives, it is believed that this rejection can now be withdrawn.

With respect to the recitation "up to about 8%" (line 7) in claim 8 and (line 8) in claim 24, applicant directs the examiner's attention to the specification at page 5, line 11, where "process aids in an amount up to about 8%" is disclosed. Accordingly, this rejection can be withdrawn.

With respect to the recitation "0.5 to 5%" (line 21 in claim 24, applicant directs the examiner's attention to the above discussion under the Section "Response to New Objections (Specification)". Accordingly, this rejection can be withdrawn.

(2) With respect to claims 26 and 27, applicant has canceled the term "inner" from claim 1; however, applicant submits that claim 10, line 4 provides sufficient antecedent basis for the term "inner layer". Accordingly, this rejection can be withdrawn.

#### **Claim Rejections – 35 U.S.C. 102**

Claims 1, 2, 8, 10 and 21-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Igarashi et al.(USP 5,223,571).

In regard to claims 1 and 10, the examiner again asserts that Igarashi et al. teach that a vulcanized tubular structure (hose, col. 5, lines 49-50). Igarashi et al. teach that the tubular structure is automotive and fluid-conveying (col. 2, lines 54-57). Igarashi et al. teach that the tubular structure exhibits heat tolerant characteristics because Igarashi et al. teach that the tubular structure is heat resistant (col. 2, lines 50-54). Any hose is resistant to some degree of pressure, so the hose of Igarashi et al. necessarily exhibits pressure resistant characteristics. The tubular structure of Igarashi et al. exhibits hydrocarbon fluid impermeability characteristics since Igarashi et al. teach that the tubular structure is gas impermeable (col. 2, lines 50-53). The tubular structure of Igarashi et al. comprises an ethylene vinyl acetate copolymer matrix ( col. 3, lines 32-35

and col. 4, lines 22-26) where the vinyl ester copolymer matrix contains greater than 40% vinyl ester based on the weight of the copolymer (col. 3, lines 48-51). Igarashi et al. teach that the composition contains not more than 250 parts by weight of the ethylene-vinyl acetate copolymer per 100 parts by weight of the second resin of the composition (the "CPA" resin of Igarashi et al., col. 3, lines 48-51), a range that overlaps with the claimed range of about 30 to 75% ethylene-vinyl acetate copolymer (e.g.,  $90/(90+100) =$  about 47%). Igarashi et al. teach that the composition contains up to 70 parts rubber additive per 100 parts CPA (col. 3, line 64-col. 4, line 7), a range that falls within the claimed range of about 25 to 70% (e.g.,  $70/(70+90+100) =$  about 27%).

In regard to claim 2, Igarashi et al. teach the ethylene-vinyl acetate copolymer matrix contains more than 60% vinyl acetate by weight of the copolymer since Igarashi et al. teach that the ethylene-vinyl acetate copolymer contains not more than 40 mol% ethylene (consequently, at least 60 mol % vinyl acetate, col. 3, lines 39-41).

In regard to claim 8, Igarashi et al. teach that the tubular structure consists essentially of 30 to 75% ethylene-vinyl acetate copolymer (e.g.,  $90/(90+100) =$  about 47%, col. 3, line 64-col. 4, line 7) and up to 70 parts rubber additive per 100 parts CPA (col. 3, line 64-col. 4, line 7), a range that falls within the claimed range of about 40 to 55%.

In further regard to claim 10, Igarashi et al. teach that the tubular structure is for conveying refrigerant in car coolers, air conditioners and other refrigerant-using devices (col. 2, lines 54-57), a teaching which falls within the scope of fluids in an automotive engine cooler, transmission oil cooler, power transmission cooler, radiator or heater.

In regard to claims 21 and 22, Igarashi et al. teach the hose as discussed above. The recitations "is a radiator hose" and "is a heater hose" are intended use recitations that have not been given patentable weight, since it has been held that a recitation with respect to the manner in which a claimed article is intended to be employed does not differentiate the claimed article from a prior art article satisfying the claimed structural limitations. *Ex*

*parte Masham*, 2 USPTQd 1647 (1987).

In regard to claim 23, Igarashi et al teach that the ethylene-vinyl acetate copolymer matrix contains more than 60% vinyl acetate by weight of the copolymer since Igarashi et al teach that the ethylene-vinyl acetate copolymer contains not more than 40 mol % ethylene (consequently, at least 60 mol % vinyl acetate, col. 3, lines 39-41).

In regard to claim 24, Igarashi et al. teach that the tubular structure consists essentially of: 30 to 75% ethylene-vinyl acetate copolymer (e.g.,  $90/(90 + 100) =$  about 47%, col. 3, line 64-col. 4, line 7 and up to 70 parts rubber additive per 100 parts CPA (col. 3, line 64-col. 4, line 7), a range that falls within the claimed range of about 40 to 55%.

In regard to claims 25-27, Igarashi et al. teach a blend of the ethylene-vinyl acetate copolymer matrix and the rubber additive (col. 3, line 64-col. 4, line 7)

#### **Examiner's Response to Applicant's Arguments**

Applicant's arguments regarding the 35 U.S.C. 102 rejection of the claims presented on page 12-17 of the previous amendment B have been fully considered but are not persuasive.

Applicant's arguments from pages 12-17 of Amdt. B regarding the 35 U.S.C. 102 rejection of claim 1 have been fully considered but are not persuasive

Applicant's arguments on page 12 through the top of page 15 have been addressed in the previous Advisory Actions. This portion of the arguments is a copy of the arguments presented in the After Final Amdt. Filed August 23, 2006.

Applicant's arguments on page 15 regarding how the hose of Igarashi et al is used

is not relevant to the patentability of the claimed article.

Applicant argues on page 15 that CPA is excluded from the scope of the claim, but applicant has not shown that the CPA "materially affect the basic and novel characteristic(s)" of the claimed invention, and therefore whether or CPA is excluded from the scope of the claim, MPEP 2111.03.

Applicant's statement that "[g] as relates to the state of the material" and the related statements in lines 2-6 of page 10 of the After Final Amdt. filed June 6, 2006 are unsupported. Applicant has not provided convincing evidence showing that Igarashi et al. intends "gas" to refer solely, or at all, to "the state of the material". A dictionary definition does not cast any light on which definition or definitions of "gas" Igarashi et al. intended to invoke in the patent.

In regard to applicant's arguments on page 16-18, applicant has not shown that the CPA "materially affect the basic and novel characteristic(s)" of the claimed invention, and therefore whether or not CPA is excluded from the scope of the claim, MPEP 2111.03.

On pages 9-10 of Amendment A, applicant argues that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate; however, since Igarashi et al. recommends that the degree of saponification be at least 90%, in instances where the degree of saponification is less than 100%, the tubular structure comprises vinyl acetate copolymer matrix as claimed in claim 1. The teaching of Igarashi et al. that the heat resistance "tends to be lowered to an insufficient level" is inconclusive and therefore does not teach away from applicant's claimed subject matter

#### **Applicant's Response to rejections and Examiner's Comments**

In regard to claim 1, applicant has amended claim 1 to replace the term "consisting essentially of" with "consisting of", and to delete any reference to the term "matrix". Accordingly, it is now believed that such claim 1 is now patentably

distinguished over the patent to Igarashi et al.

In regard to claim 2, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated nor rendered obvious by the patent to Igarashi et al. as argued above. Furthermore, since claim 2 merely recites further limitations of a base claim that applicant believes to be allowable, applicant submits that dependent claim 8 also is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection of claim 2 should be withdrawn

In regard to claim 8, applicant has amended claim 8 to replace the language "consisting essentially of" with "consisting of". Furthermore, since claim 8 merely recites further limitations of a base claim that applicant believes to be allowable, it is believed that dependent claim 8 also is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection of claim 8 should be withdrawn.

In regard to claim 10, applicant has amended claim 10 to replace the term "consisting essentially of" with "consisting of" and to delete any reference to the term "matrix". Accordingly, it is now believed that such claim 10 is now patentably distinguished over the patent to Igarashi et al.

In regard to claim 21, applicant submits that, since claim 21 wherein the hose is defined as a radiator hose and merely recites further limitations of the base claim 10, claim 21 also is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection should be withdrawn.

In regard to claim 22, applicant submits that, since claim 22 wherein the hose is defined as a heater hose and merely recites further limitations of the base claim 10, claim 22 is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection should be withdrawn.

In regard to claim 23, applicant submits that claim 23 merely recites further



limitations to base claim 10. Claim 23 also is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection should be withdrawn.

In regard to claim 24, applicant has amended claim 24 to replace the language "consisting essentially of" with "consisting of". Furthermore, since claim 24 merely recites further limitations of a base claim that applicant believes to be allowable, it is believed that dependent claim 8 also is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection of claim 8 should be withdrawn.

In regard to claim 25, applicant submits that claim 25 merely recites further limitation to base claim 1. Claim 25 is neither anticipated nor rendered obvious by the patent to Igarashi et al. Therefore, this rejection should be withdrawn.

Claim 26 has been canceled.

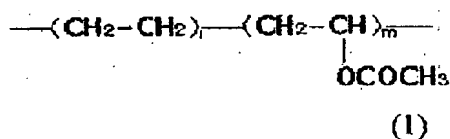
In regard to claim 27, the term "inner" has been deleted. Accordingly, this rejection can now be withdrawn.

The following remarks are repeated from prior responses and amendments provided by the applicant:

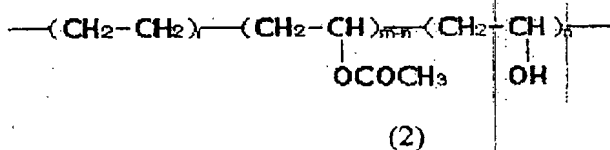
Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins are not suitable, and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory, in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer

contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34).

Applicant submits that simply because the saponified ethylene-vinyl acetate copolymer contains pendent acetate groups does not make the polymer an ethylene vinyl acetate copolymer. Nor does the saponification of an ethylene-vinyl acetate copolymer provide a polymeric mixture of ethylene-vinyl acetate copolymer and ethylene-vinyl alcohol copolymer. Once the saponification has occurred, the resulting polymer product is either an ethylene-vinyl acetate-vinyl alcohol terpolymer or an ethylene-vinyl alcohol copolymer, depending on the degree of saponification. Applicant contends that chemically and structurally, ethylene-vinyl acetate copolymers and saponified ethylene-vinyl acetate copolymers are distinctly different from one another. Ethylene-vinyl acetate copolymer has the structure (1):



while saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer where less than all of the pendant acetate groups are converted, i.e., saponification is less than 100%) has the structure (2):



When saponification is 100% where all of the pendant acetate groups have been converted to hydroxyl groups, the saponified ethylene-vinyl acetate copolymer is polyvinyl alcohol. As shown in structure (2), the polymer chain contains "m-n" acetate

groups and also contains "n" hydroxyl groups, and the resulting polymer is an ethylene-vinyl acetate-vinyl alcohol terpolymer. The numerical values of the numerals "m-n" and "n" are determined by the degree of saponification. When the value of "n" is equal to the value of "m", saponification has reached 100% and there is no longer any pendant acetate groups present in the polymer chain; therefore, the resulting polymer is an ethylene-vinyl alcohol copolymer. When the value of "m" is larger than "n" and "n" is not zero, the resulting polymer is ethylene-vinyl acetate-vinyl alcohol terpolymer (structure 2). Where "n" is zero, the polymer is not a saponified ethylene-vinyl acetate copolymer. Igarashi et al recommends that the saponified ethylene-vinyl acetate copolymer contain not more than 40 mol % of ethylene and not less than 90 mol % vinyl acetate of the ethylene-vinyl acetate be saponified (col. 3, lines 39-42). A person skilled in the art would recognize the distinctions between a saponified ethylene-vinyl acetate copolymer and an ethylene-vinyl acetate copolymer and, furthermore, such person skilled in the art would understand that the two polymers have different characteristics and properties, in addition to having different structures. Actually, Igarashi et al desires that not less than 90% of the vinyl acetate of the ethylene-vinyl acetate copolymer is saponified. If the degree of saponification of the vinyl acetate is below 90 mol % the heat resistance of the product formed of the resinous composition tends to be lowered to an insufficient level (col. 3, lines 39-47). As seen from structure (2) above, ethylene-vinyl acetate-vinyl alcohol terpolymers where the numerical value of the numeral "n" is nearly equal to the numerical value of "m", i.e., the saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer) contains relatively few pendant acetate groups compared to the relatively high number of pendant hydroxyl groups. Such example is exemplary of a saponified ethylene-vinyl acetate copolymer where the saponification is relatively high, e.g., greater than about 90 mol %.

The hydrolysis (or saponification) of ethylene-vinyl acetate copolymers are well known in the art. For example, U.S. Pat No. 4,137,364 describes the conversion of the vinyl acetate groups on the ethylene-vinyl acetate copolymer to hydroxyl groups. Depending on the degree of hydrolysis (or saponification) some or all of the acetate groups are converted to hydroxyl groups. As stated above, complete hydrolysis (or

saponification) results in a copolymer consisting of ethylene and vinyl alcohol units, when the hydrolysis (or saponification) is incomplete, the hydrolyzed (or saponified) copolymer consists also of vinyl acetate units together with the ethylene and vinyl alcohol units.

Igarashi et al clearly indicates that, as the degree of saponification of the vinyl acetate is decreased, whereby the saponified ethylene-vinyl acetate copolymer contains a greater number of vinyl acetate pendant groups relative to the number of vinyl alcohol pendant groups, the heat resistance of the structure tends to be lowered. Contrary to the Examiner's opinion, Applicant believes that such disclosure would more likely than not, lead a person skilled in the art away from employing an ethylene-vinyl acetate copolymer as a tubular structure (claims 1, 2 and 8) or hose (claims 10 21-24) as presently claimed.

Furthermore, as stated earlier Igarashi et al. requires the presence of a CPA resin which must be employed either with or without the saponified ethylene-vinyl acetate copolymer. In view of the above amendments wherein claims 1 and 10 have been amended to recite the term "consisting of" language, applicant submits that the present claims excludes, not only the presence of a CPA resin, but also excludes the presence of saponified ethylene-vinyl acetate copolymers, ethylene-vinyl alcohol copolymers and ethylene-vinyl acetate-vinyl alcohol terpolymers.

The examiner asserted earlier that the tubular structure of Igarashi et al. exhibits hydrocarbon fluid impermeability characteristics since Igarashi et al. teach that the tubular structure is gas impermeable. Applicant's response to the Examiner's allegation was merely to suggest that gas impermeability does not necessarily translate to hydrocarbon fluid impermeability. However, gas does relate to the state of the material and, in the application of Igarashi et al., the gas is used for cooling such as in refrigeration and air conditioning devices. Such devices typically employ fluorocarbons or other materials in the form of gas. It is noted that Igarashi et al. do not refer to their tubular structure as being liquid impermeable, nor does Igarashi et al disclose that their hose is liquid-impermeable. In the Advisory Action mailed June 20, 2006, the Examiner

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suggests that Applicant's statement that "[g]as relates to the state of the material" is unsupported and that Applicant has not provided convincing evidence showing that Igarashi et al. intends "gas" to refer solely, or at all, to "the state of the material". In the response to the examiner's statement, Applicant referred to "The American Heritage Dictionary of the English Language, new College Edition" which defines "gas" as "[t]he state of matter distinguished from the solid and liquid states...", and further to "Hawley's Condensed Chemical Dictionary, Twelfth Edition", which defines "gas" as "a" state of matter..." In the latest Office Action, the examiner states that "Applicant has not provided convincing evidence showing that Igarashi et al intends "gas" to refer solely, or at all, to "the state of the material." The examiner further states that "A dictionary definition does not cast any light on which definition or definitions of "gas" Igarashi et al intended to invoke in the patent. What Igarashi et al did or did not intend is immaterial, what is material is what Igarashi discloses, and Igarashi et al. disclose that the hose be "gas" impermeable and since the cited dictionaries define gas as a state of matter distinguished from the solid or liquid states, it follows that he intended gas. Accordingly, applicant submits that the present invention is neither anticipated nor obvious over the teachings of Igarashi et al. In any case, Applicant believes that the present claims as amended herein are neither anticipated nor obvious over the cited references

In view of the forgoing amendments and remarks, it is believed that the present application is now in condition for allowance and an early indication thereof is earnestly solicited.

Dayco Products, LLC  
1 Prestige Place  
Miamisbure, Ohio 45342  
Telephone No.: (937) 336-5725

Respectfully Submitted,

  
J. Daniel Lykins  
Reg. No. 27,354

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